290 CUNDLES ROAD EAST
TOWNHOUSE DEVELOPMENT
FUNCTIONAL SERVICING REPORT
CITY OF BARRIE

Prepared by:

Pinestone Engineering Ltd.
Barrie Office
20 Bell Farm Road
Barrie, Ontario L4M 6E4

Phone: 705-503-1777
Fax: 705-645-7262
Email: pinestone@pel.ca
Web: www.pel.ca

July 28th, 2023
23-11757B – Rev. 0

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APPENDICES

1.0 INTRODUCTION

1.1 General

The site is located at 290 Cundles Road East the City of Barrie and is currently part of the Barrie Free Methodist Church property. The land subject to development equates to an area of 0.28 hectares and is located at the east end of the property fronting Livingstone Street East. The property is legally described as Part of Lot 20, Concession 3, Geographic Township of Vespra, City of Barrie, County of Simcoe.

The site is bounded by residential development to the north and south, the Church lands to the east and Livingstone Street East to the west. The location of the subject site is illustrated on Figure 1.

The developer is proposing to construct 3 blocks of townhouse units totaling 22 units, a surface parking facility, a common amenity/landscape space, and an at grade parking garage located at the ground floor of the 12 unit stacked back to back townhouse block. Access to the development will be provided from Livingstone Street East. The existing access from Livingstone will be relocated to the north limit of the property and will serve as access to both the proposed townhomes and existing Church property.

A reduced copy of the proposed site plan concept prepared by Innovative Planning Solutions (IPS) is included in Appendix A for additional information.

1.2 Purpose and Scope

Pinestone Engineering Ltd. (PEL) has been retained by the developer to provide professional engineering services related to the preparation of a Functional Servicing Report (FSR). This report has been prepared to support a Rezoning Application for the subject lands. The purpose of this report is to describe the existing servicing infrastructure in the vicinity of the site, and provide recommendations for the provision of sanitary drainage, water distribution, and storm water management in accordance with City of Barrie criteria.

2.0 EXISTING CONDITIONS

2.1 General

The development area is approximately 0.28 hectares and is currently vacant. The site is located within the City's urban servicing area and municipal water servicing is available for connection beneath Livingstone Road East. Storm and sanitary drainage must be routed internally through the Church lands to existing connections on the northeast corner of the Church property. Existing vegetation on the site generally consists of maintained grass area throughout, with sporadic tree growth along the peripheral of the property boundaries.

PEL
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290 CUNDLES ROAD EAST
RESIDENTIAL DEVELOPMENT

LOCATION PLAN

DATE:	SCALE:	PROJECT No.	FIGURE No.
JUNE 2023	N.T.S.	23-11757B	FIGURE 1

2.2 Topography

Based on a review of the topographic survey provided by JOETOPO, the property is moderately sloped and generally slopes from west to east towards the existing Church parking lot at an average slope of 3.5%. Elevations across the site range between 260.65m ASL at the western property corner to 257.90m ASL at the eastern corner of the property where the asphalt driveway exists.

2.3 Site Geology

A preliminary geotechnical test pit investigation was completed by GEI Consultants in March 2023. Field work for this investigation consisted of four test pits excavated to 2.1 to 2.2m in depth. Based on our review of their letter report, the test pits revealed topsoil/parking lot fill over a native soil silt till with some sand, trace clay, cobbles and boulders, and was compact and moist. No groundwater was noted during the test pit investigation.

Based on our review of the soil descriptions outlined in the MTO Drainage Manual on Chart 1.08, we have classified the site material as Type C under the Soil Conservation Service, hydrologic soil group.

A copy of the geotechnical investigation, prepared by GEI Consultants, and Chart 1.08 of the MTO Drainage Manual is included in Appendix B.

2.4 Drainage Conditions

Drainage from the development area flows in the form of overland sheet flow towards the existing asphalt parking lot servicing the Church. From here, drainage continues easterly through the Church property and outlets to an existing swale and ditch inlet catch basin located north of the exiting Church building in the low corner of the property. Runoff collected by the existing ditch inlet discharges to the existing storm sewer system on Lions Gate Boulevard and outlets to an existing municipal storm water management facility (wet pond #65)

Based on our review of the site plan approval drawings for the Church, the proposed development area was anticipated to be a future parking lot. Downstream conveyance features and overland routes were sized to consider runoff from the proposed development area. A copy of the previously approved site plan and drainage plan are included in Appendix C for reference.

The site is located within the Little Lake sub watershed area.

3.0 SANITARY SERVICING

3.1 Existing Sanitary Servicing

An existing 250mm diameter sanitary sewer exists north of the existing Church and conveys

sewage from the Church northwesterly to Lions Gate Boulevard. Sewage is then conveyed northeast via municipal sewers before out letting to the Little Lake SPS (PS6) located on Duckworth Street.

3.2 Proposed Sanitary Flows

Contributing sanitary flows from the proposed development were calculated using design criteria for high density apartment dwellings and commercial space per the City of Barrie Sanitary Sewage Collection System Policies and Design Guidelines (2023), as follows:

- A residential average sewage flow of 225 litres/capita/day
- A residential population density of 2.34 persons/unit
- An extraneous flow rate of 0.1 litres/sec/ha
- A peaking factor based on Harmon's equation for residential flows.

With a total residential count of 22 townhouse units, the total population to be serviced is 51 persons based on the above distribution. Incorporating extraneous flows, the combined peak sewage flow generated by the proposed development is calculated to be approximately 0.61L/sec. Detailed sanitary calculations are included in Appendix C.

A review of the existing capacity of the immediate downstream reach of 250mm sanitary sewer currently servicing the Church property was completed. The existing reach of sewer has a conveyance capacity of approximately 59.4L/sec and the proposed peak sanitary flows from the new townhouse development represents approximately 1.0% of the total pipe capacity.

Based on the total conveyance capacity of the immediate downstream reach of sewer and the minimal flows proposed, the existing infrastructure is expected to have the available capacity necessary to support the development without the need for external sanitary upgrades.

3.3 Proposed Sanitary Servicing

The proposed development will utilize the existing 250mm diameter sanitary sewer on the Church property. A new 200mm diameter gravity sanitary sewer will be extended to the townhouse development area internally along the north limit of the existing parking area. Servicing details will conform to City of Barrie standards and the exact size and location of the mains will be finalized during detailed design stage for Site Plan Approval (SPA). A servicing easement will be required over the proposed sanitary sewer within the Church lands once further details are established through the SPA process.

A conceptual servicing layout is provided on the attached drawings included in Appendix D.

4.0 WATER SERVICING

4.1 Existing Water Servicing

A 300mm diameter watermain exists beneath the eastern boulevard of Livingstone Street East. For the purposes of the rezoning application, onsite pressures and flows have been confirmed to ensure there is sufficient capacity available for both domestic and firefighting conditions.

We have utilized information obtained from the municipal hydrants #391 and #392 located along Livingstone Street East which are connected to the existing 300mm dia. watermain including Hydrants #2999 and #1079. Table 1 illustrates the flow results of the testing conducted by Vipond Inc.

Table 1
Results of Hydrant Flow Tests

Test #	Outlet Inside Dia. (in.)	Number of Outlets	Residual Reading (PSI)	Flow@ Residual (gal/min)
0	---	---	100 (Static)	---
1	1.75	1	95	534
2	2.5	1	95	924

Refer to Appendix C for the flow testing information obtained from Vipond Inc.

4.2 Proposed Water Demands

The subject site is located within Water Pressure Zone 2N reduced. As per the City of Barrie Water Supply Masterplan (WSP, July 2019), domestic water demands for the development are listed in Table 2 below. Design parameters referenced from the City of Barrie Water Transmission and Distribution Design Standard (2022) and Water Supply Masterplan are as follows:

- Max day factor of 1.80 per Table 3.5 of the Water Supply Masterplan, and peak hour factor of 2.25 based on Table 3-1 of the MECP Design Guidelines for Drinking Water Systems (2008).
- Townhouse Development – 2.34 persons per unit.
- Residential water demand of 162 L/cap/day per Table 3.5 of the Water Supply Masterplan.

Table 2
Domestic Water Demand

Population	Residential Consumption (L/sec)	Peaking Factors		Domestic Flows (L/sec)	
		Peak Hour	Maximum Day	Peak Hour	Maximum Day
51	0.01	2.25	1.80	0.02	0.02

Fire demands for the proposed development were calculated in accordance with the Fire Underwriters Survey (FUS) as follows:

$$F = 220C(A)^{0.5}$$

Where,

F = the required fire flow in litres per minute.
C = coefficient related to the type of construction.
A = total floor area of building (excluding basements)

Table 3
Water Requirements for Fire Fighting

Total Area (m^2)	Coefficient "C"	Required Flow (L/min)	Require Flow (L/sec)
1188	1.0	7,600	126.7

The total area represents the largest 12 unit building and it was assumed to be a 3-storey building. Based on the guidance provided in the FUS, and applying the relevant reductions and charges in flow for construction type, and exposure distances due to the proximity of the other existing buildings, the required fire flow for the development will be reduced to 123.5 L/sec. Preliminary FUS calculations are provided in Appendix C. Detailed FUS calculations will be completed at the SPA stage once final building details are known.

4.3 Proposed Water Servicing

The proposed development will be serviced via a new 150mm dia. fire service connection and a new 50mm dia. domestic water service connection off the existing 300mm dia. watermain located beneath Livingstone Street East. Requirements for separate domestic and fire lines will be assessed at the detailed design stage. Servicing details will conform to City of Barrie standards and the exact size and location of the service laterals will be finalized during detailed design stage for Site Plan Approval (SPA).

Based on the provided flow test results, it can be concluded that the max day plus fire flow rate of 123.5L/sec can be delivered to the proposed building with a residual pressure of 95 psi. A conceptual servicing layout illustrating the proposed water servicing strategy is provided on the drawings included in Appendix D.

5.0 STORM WATER MANAGEMENT PLAN

5.1 Quantity Control

As previously noted, the proposed development area was contemplated to be an asphalt parking area. This is identified on the Church SPA storm drainage plan prepared by Richardson Engineering in 2003 (included in Appendix C for reference). The proposed development area is located within drainage catchment area 1 which is to drain northeasterly to the existing storm structure located in the north corner of the property.

Therefore, post development drainage from the development must be directed through the Church property and quantity control is not required. Appropriate easements for drainage are required to permit surface drainage from the proposed development to flow through the Church property.

Runoff from the site will be directed to an enhanced grass swale within the amenity space. The grass swale will discharge to a proposed bio-retention cell before overtopping to the existing asphalt parking lot and surface flowing northeasterly to the existing storm structure. Although quantity control is not required, implementation of the proposed low impact development controls (LIDs) on the subject site will provide significant quantity control benefits over the original SWM plan that is in place for the Church and the future parking lot expansion.

5.2 Quality Control

In order to provide water quality enhancement to an “enhanced” level of protection (80% TSS removal) for this development, we have incorporated a “treatment train” approach consisting of the following elements:

- Provision of “soft” landscaping where feasible.
- Yard grading using minimal surface slopes where possible to promote infiltration.
- Installation of an enhanced grass swale and bioretention cell.
- Installation of a soakaway infiltration gallery to infiltrate roof runoff from the 12-unit townhouse block. Infiltration rates and final sizing to be confirmed at the SPA stage.
- Suitable construction mitigation measures to be utilized during the site development.

5.3 Water Balance & Phosphorus Loading

A water budget analysis and phosphorus budget will be provided at the detailed design stage for SPA. Conceptually, water balance and phosphorus loading will be mitigated

onsite through implementation of LIDs. These include infiltration of roof water and the construction of enhanced swales and bioretention cells.

6.0 EROSION AND SEDIMENT CONTROL

6.1 Mitigation Measures

Sedimentation and erosion control measures are required during construction and until such a time that all lot grading and building construction has been completed, the driveway has received its final surface treatment, and vegetation has been established in all landscape areas so that there are no open soils.

The use of various siltation control measures will be implemented to protect the adjacent properties and receiving waterbodies from migrating sediments. These works include but may not be limited to:

- Installation of siltation fencing along the perimeter of the development area, prior to earthwork operations.
- Installation of a vehicle tracking mud mat at the entrance to the site.
- Installation of silt sacks within existing and proposed storm structures to prevent sedimentation.

Prior to carrying out site grading, the siltation barriers and mud mats shall be in place. Any onsite storm sewer works will not be permitted to outlet to the municipal storm sewer network until the site has been stabilized.

Other temporary installations of silt fence or other appropriate measures may be required during grading to minimize silt migration from the site. The measures will need to be removed, replaced and relocated as required during the construction period until the site works have been completed and vegetation established. During construction, all stockpiled material will be placed up-gradient of the siltation controls with additional siltation fencing installed around the stockpiles.

6.2 Monitoring and Maintenance During Construction

It is the responsibility of the contractor and owner to maintain the siltation control devices until suitable grass cover has been established upon completion of construction.

A regular review of the facilities by the contractor should be carried out during the construction period to ensure that the facilities are being properly maintained, and if necessary, replaced. Inspection reports are to be completed monthly and distributed to the owner, contractor, and City.

If site works are to continue through the winter and spring the engineer should be contacted by the owner to review the measures in place with the contractor on a regular basis to

ensure that the facilities are adequate and in good working order.

All reasonable methods to control erosion and sedimentation are to be taken during construction. The contractor should inspect the siltation devices immediately after each rainfall. Damaged devices should be repaired immediately, and additional devices installed if necessary. Silt should be removed from the fencing and related siltation devices when deposits are noticeable.

Should the erosion control measures fail, and sediment migrate beyond the limits of the control works, the following tasks should be carried out:

- The City of Barrie should be notified of the event. The area will be assessed and cleaned up to the satisfaction of the agencies.
- Additional sedimentation facilities be installed in the area of the migration and down gradient to contain the sediment.
- The Ministry of Natural Resources should be contacted in the event that sediment is transported downgradient of the site.

7.0 SUMMARY AND CONCLUSIONS

The findings of this report are summarized as follows:

- The proposed development will be serviced by the existing 250mm diameter sanitary sewer currently servicing the Church.
- The proposed development will be serviced via a new 150mm dia. fire service connection and a new 50mm dia. domestic water service connection off the existing 300mm dia. watermain located beneath the Livingstone Street East.
- Attenuation of peak post-development flowrates is not required for this development as the development area was previously contemplated to be an asphalt parking lot. Quantity control will be provided inherently through the implementation of best management practices and installation of LIDs onsite.
- Quality control for the development will be provided by a treatment train approach consisting of the installation of LIDs consisting of grassed swales, bioretention cells, and infiltration galleries.
- Further details, calculations, and hydrological modelling for the proposed stormwater management facilities will be provided at the detailed design stage in support of the site plan application.

We recommend that this report and drawings be submitted to the City of Barrie for review and approval.

We trust this is satisfactory and should you have any questions, please call.

All of which is respectfully submitted by,

PINESTONE ENGINEERING LTD.

Joe Voisin, P.Eng
Senior Engineer

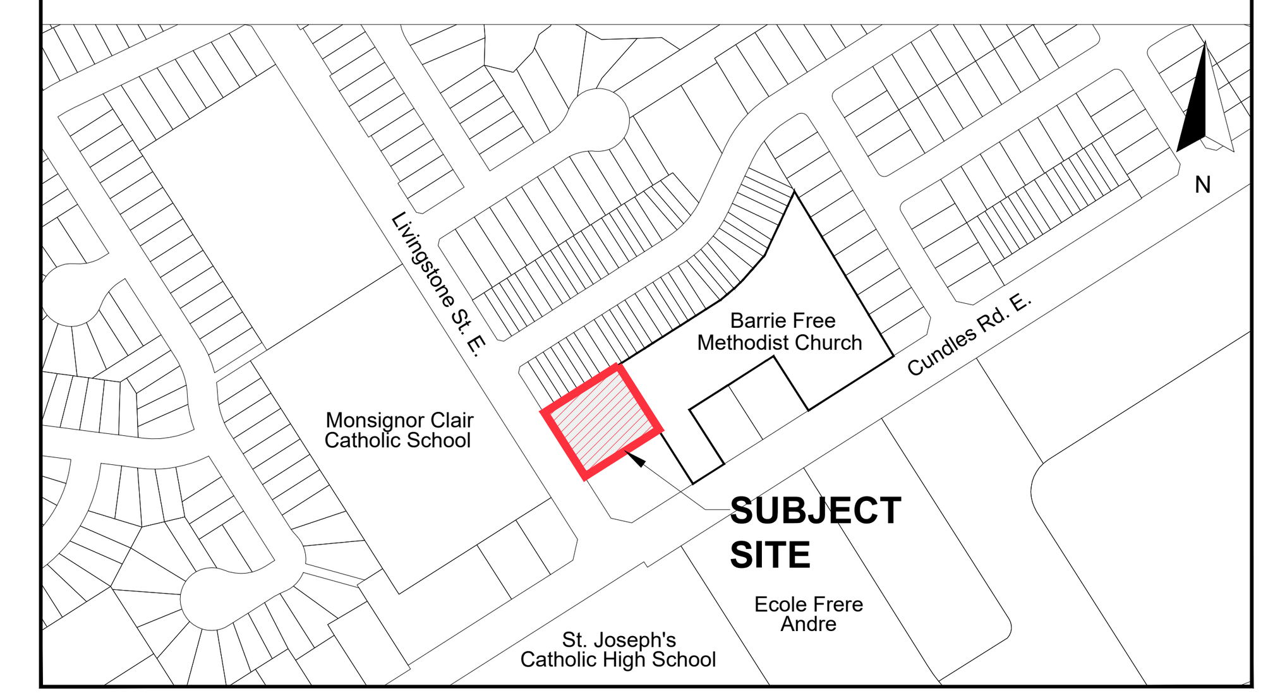
APPENDIX A

Proposed Site Plan Concept (IPS)

PINESTONE ENGINEERING LTD.

KEY MAP

Scale: 1:5000



CONCEPTUAL SITE PLAN

Scale

0 5 10 15 20m

LEGEND

- Subject Site (2,892.68m² / 0.28ha)
- 3 Storey Back-To-Back Town's ('Type 1'): 10 units
  - Bldg. Area (4 units): 238.56m²
  - Bldg. Area (6 units): 352.84m²
  - Combined Bldg. G.F.A.: 1,774.20m² (incl. private garage)
- 3 Storey Back-To-Back Town's ('Type 2'): 12 units
  - Bldg. Area: 394.63m²
  - Bldg. G.F.A.: 1,183.89m²
- Second Storey Deck (83.05m²)
- Amenity Area (269.35m²)
- Storm Pipes
- Water Mains
- Water Hydrants

RESIDENTIAL MULTIPLE DWELLING SECOND DENSITY (RM2) ZONE

Provisions	Required	Provided
Lot Area (min.)	720.0m²	2,892.68m²
Lot Frontage (min.)	21.0m	49.97m
Front Yard to Dwelling Unit (min.)	4.5m	1.39m
Side Yards (min.)	1.2m	1.20m
Rear Yard (min.)	7.0m	2.71m
Landscaped Open Space	35%	31.79% (919.69m²)
Lot Coverage (max.)	60%	36.95% (1,069.08m²) - Bldg: 986.03m² - Deck: 83.05m²
Height of Main Bldg. (max.)	10.0m	- 14.30m (Stacked B2B) - 12.00m (B2B)
Landscaped Buffer Areas (5.3.7.1.)	A parking area of more than 4 parking spaces adjoining a residentially zoned required a continuous landscaped buffer area with a min. width 3.0m shall be provided along the abutting lot line and a continuous tight board fence with a min. height of 2.0m	3.00m with 2.0m tight board fence (north property line)
Outdoor Amenity Area (5.2.5.2.)	264.0m² (12.0m² / unit in a consolidated form)	269.35m²
Max. G.F.A.	60%	102.26% (2,958.09m²)
Required Parking: Residential Bldg. containing more than 3 dwelling units	1.5 spaces / dwelling unit. Tandem parking not permitted. (33 spaces)	34 spaces (1.55 spaces / unit) - 14 covered parking - 10 townhouse parking (not incl. private garage) - 10 visitor parking
Required Barrier Free Parking	1 Type 'A' and 1 Type 'B' B.F. space	1 Type 'A' and 1 Type 'B' B.F. space
Density (5.2.5.1.a)	40 units / ha	78.57 units / ha

Source: City of Barrie, Comprehensive Zoning By-Law 2009 - 141, Jan. 2022

Note: Information shown is approximate and subject to change.

CONCEPTUAL SITE PLAN - 22 UNITS

290 CUNDLES EAST, BARRIE

SCHEDULE OF REVISIONS

No.	Date	Description	By
3.	May 5, 2023	Increase B2B bldg. width;	A.S.
4.	May 15, 2023	Revise Site Plan;	A.S.
5.	May 23, 2023	Revise Site Plan;	A.S.
6.	May 24, 2023	Revise Site Plan;	A.S.
7.	July 25, 2023	Revise Site Plan;	A.S.

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647 WELHAM ROAD, UNIT 9, BARRIE, ON, L4N 0B7
tel: 705 • 812 • 3281 fax: 705 • 812 • 3438 e: info@ipsconsultinginc.com www.ipsconsultinginc.com

Date:	Jan. 3, 2023	Drawn By:	A.S.
File:	22 - 1256	Checked:	G.B.

APPENDIX B

Geotechnical Letter Report

PINESTONE ENGINEERING LTD.

Design Chart 1.08: Hydrologic Soil Groups (Continued)

- Based on Soil Texture

Sands, Sandy Loams and Gravels	
- overlying sand, gravel or limestone bedrock, very well drained	A
- ditto, imperfectly drained	AB
- shallow, overlying Precambrian bedrock or clay subsoil	B
Medium to Coarse Loams	
- overlying sand, gravel or limestone, well drained	AB
- shallow, overlying Precambrian bedrock or clay subsoil	B
Medium Textured Loams	
- shallow, overlying limestone bedrock	B
- overlying medium textured subsoil	BC
Silt Loams, Some Loams	
- with good internal drainage	BC
- with slow internal drainage and good external drainage	C
Clays, Clay Loams, Silty Clay Loams	
- with good internal drainage	C
- with imperfect or poor external drainage	C
- with slow internal drainage and good external drainage	D

Source: U.S. Department of Agriculture (1972)

July 27, 2023

Cal-Parc Development Inc.
12 Trotter Court
Barrie, Ontario
L4N 5S4

Attn: Mr. Dave Seaman

RE: Preliminary Geotechnical Test Pit Investigation
Proposed Townhouse Development
290 Cundles Road East, Barrie, Ontario
Project No. 2300804 Revision 2

GEI Consultants Ltd. (GEI) was retained by Cal-Parc Developments Inc. to complete a subsurface investigation and provide a preliminary geotechnical report for the proposed townhouse development at 290 Cundles Road East in Barrie, Ontario. The site is shown in Figure 1 in Enclosure 1.

1. INTRODUCTION

Development of the lands located at 290 Cundles Road East in the northeast quadrant of the intersection of Cundles Road East and Livingstone Street East is proposed. The current concept has several blocks with a total of 22 units that will be three-storeys. Full-depth basements are not proposed however, it is understood that the lower level may have partial burial of some walls in some areas due to the grading. Paved access and parking will be provided and the site will be serviced through connection with municipal servicing.

A preliminary subsurface investigation consisting of a program of test pits was carried out at the site as part of due diligence. Based on the test pit information, a geotechnical report was requested with preliminary geotechnical engineering recommendations for available bearing capacities for foundations, floor slabs, basements/drainage and constructability considerations such as excavations and temporary groundwater control.

Geoenvironmental assessment or chemical testing was not part of the current scope.

2. PROCEDURES AND METHODOLOGY

On February 22, 2023, a representative of our technical staff visited the site to observe the subsurface conditions within four (4) test pits excavated by the Owner. Test Pits 1 to 4 were excavated to 2.1 to 2.2 m depth.

The approximate test pit locations are provided in Figure 1 in Enclosure 1.

The stratigraphic descriptions were based on visual assessment. Inferred consistency or relative density of the soil strata was determined based on tactile probing of the material. The exposed conditions in the test pit were also assessed visually. Test pits were backfilled upon completion.

The GEI field staff examined the soils encountered in the test pits, including the presence of fill materials, groundwater observations during and upon completion of the excavation.

3. SITE AND TEST PIT OBSERVATIONS

A detailed breakdown of the results of each test pit is provided in the table below.

	Test Pit 1	Test Pit 2	Test Pit 3	Test Pit 4
Relative Location on the Property	Northeast corner of site.	Southeast corner of site.	North central part of site.	Northwest corner of site
GPS Coordinates	N: 4918774.6 E: 604767.7	N: 4918756.5 E: 604770.7	N: 4918767.3 E: 604752.4	N: 4918753.4 E: 604738.7
Ground Surface Elevation (m)	259.05	258.80	259.45	259.95
Stratigraphy Encountered (Depth)	0.0m to 0.45m – Parking Lot Fill – Sand and gravel, some silt, compact, brown, moist over sandy silt, compact, dark brown, moist 0.45m to 2.1m – NATIVE SOIL – Silt Till, some sand, trace clay and gravel, cobbles and boulders, compact, brown, moist	0.0m to 0.1m – Topsoil. 0.1m to 0.3m – FILL – Sandy silt, trace gravel, loose, brown, moist 0.3m to 2.1m – NATIVE SOIL – Silt Till, some sand, trace clay and gravel, cobbles and boulders, compact, brown, moist	0.0m to 0.3m – Topsoil. 0.3m to 0.7m – FILL – Sand, trace to some silt, trace organics, loose, brown, very moist 0.7m to 2.1m – NATIVE SOIL – Silt Till, some sand, trace clay and gravel, cobbles and boulders, compact, brown, moist	0.0m to 0.15m – Topsoil. 0.15m to 0.5m – FILL – Silty sand, trace organics, loose, brown, moist 0.5m to 2.2m – NATIVE SOIL – Silt Till, some sand, trace clay and gravel, cobbles and boulders, compact, brown, moist
Groundwater and Caving Conditions	No groundwater observed in test pit upon completion. No seepage was noted in the test pit.	No groundwater observed in test pit upon completion. No seepage was noted in the test pit.	No groundwater observed in test pit upon completion. Minor seepage was noted in fill above till. No accumulation in base of test pit.	No groundwater observed in test pit upon completion. No seepage was noted in the test pit.

4. GEOTECHNICAL ENGINEERING RECOMMENDATIONS

4.1. Foundations

The test pits encountered 0.3 to 0.7 m of topsoil and fill which are considered unsuitable to support footings. Footings for the houses can be supported on the native silt till deposit where the footing can be designed for a geotechnical reaction at Serviceability Limit State (SLS) of 100 kPa and a factored geotechnical resistance at Ultimate Limit State (ULS) of 150 kPa.

The minimum strip footing widths to be used shall be dictated as per the Ontario Building Code.

Any founding elements exposed to ambient air temperature throughout the year must be provided with a minimum of 1.2 m of earth cover for frost protection. Where earth cover less than 1.2 m, additional equivalent insulation is required. A 25 mm thick polystyrene insulation board is equivalent to 300 mm of soil cover.

Prior to pouring concrete for the footings, the footing subgrade must be cleaned of deleterious materials or caved materials, loose/weathered bedrock and any standing water. During the excavation and construction of the footings GEI should be retained to inspect the founding base to ensure the subgrade has been properly prepared and that the integrity of the founding soil has been maintained.

4.2. Floor Slabs

A lightly loaded unreinforced concrete slab can be constructed for each unit on the native till deposit at this site provided the full depth of the topsoil/fill is removed.

The native subgrade soil for the slab on grade must be assessed by the geotechnical engineer, prior to the placement of an aggregate base. It is necessary that the floor slabs be provided with a capillary moisture barrier and drainage layer.

4.3. Basements/Drainage

Basement walls must be designed to resist unbalanced lateral earth pressures imparted from the weight of adjacent soils.

Where partial basements are constructed, all basement foundation walls must be provided with damp-proofing provisions in conformance to the Ontario Building Code. A perimeter drainage system must be installed that will remove any water that infiltrates into the building backfill, to ensure that any water does not infiltrate into the basement.

For the slab-on-grade structures planned, perimeter and under-slab drainage at the foundation level is not required, provided that the underside of concrete slab is at least 200 mm above the prevailing grade of the site.

4.4. Excavation and Groundwater Control

Excavation to about 2 m depth is anticipated and will encounter the surficial topsoil/fill and the underlying native silt till. Harder digging and the presence of cobbles and boulders should be expected in the till soil.

Excavations must be carried out in accordance with the Occupational Health and Safety Act, Ontario Regulation 213/91 (as amended), Construction Projects, Part III - Excavations, Section 222 through 242. Where workers must enter an excavation, the soil must be suitably sloped and/or braced in accordance with the OHSA. For this site, excavation sidewalls are to be constructed no steeper than 1 horizontal to 1 vertical from the base of the excavation.

Excavation sidewalls will need to be continuously reviewed for evidence of instability and groundwater seepage, particularly following periods of heavy rain or thawing. When required, remedial action must be taken to ensure the continued stability of excavation slopes and the safety of the workers.

Groundwater seepage was not encountered in any of the test pits, except minor seepage from the fill that had a very limited volume (water did not accumulate at the base of the test pit). Based on this, no major groundwater problems are anticipated for excavation down to 2.0 m depth below existing grade. Any seepage should be controllable by conventional pumping.

A Permit-to-Take-Water (PTTW) is not required. Registry on the Environmental Activity and Sector Registry (EASR) system is also not required.

5. CONCLUSION

We trust this information is sufficient for your present purposes. Should you have any questions concerning the above, or can be of any further assistance, please do not hesitate to contact the undersigned.

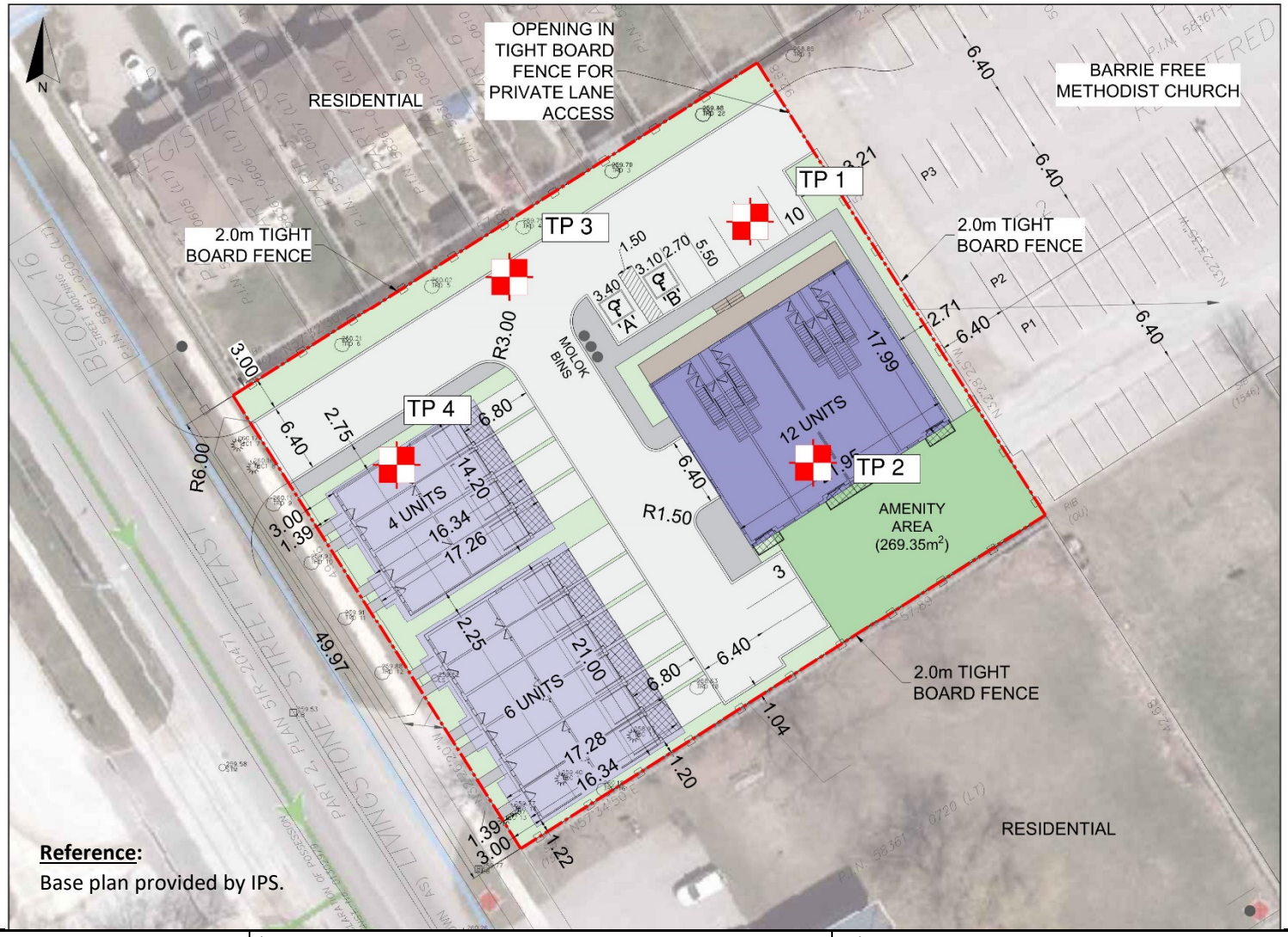
Yours truly,
GEI Consultants

Geoffrey R. White, P.Eng.
Geotechnical Practice Lead

Enclosures (1)
Test Pit Location Plan

ENCLOSURE 1

Test Pit Location Plan



Reference:
Base plan provided by IPS.

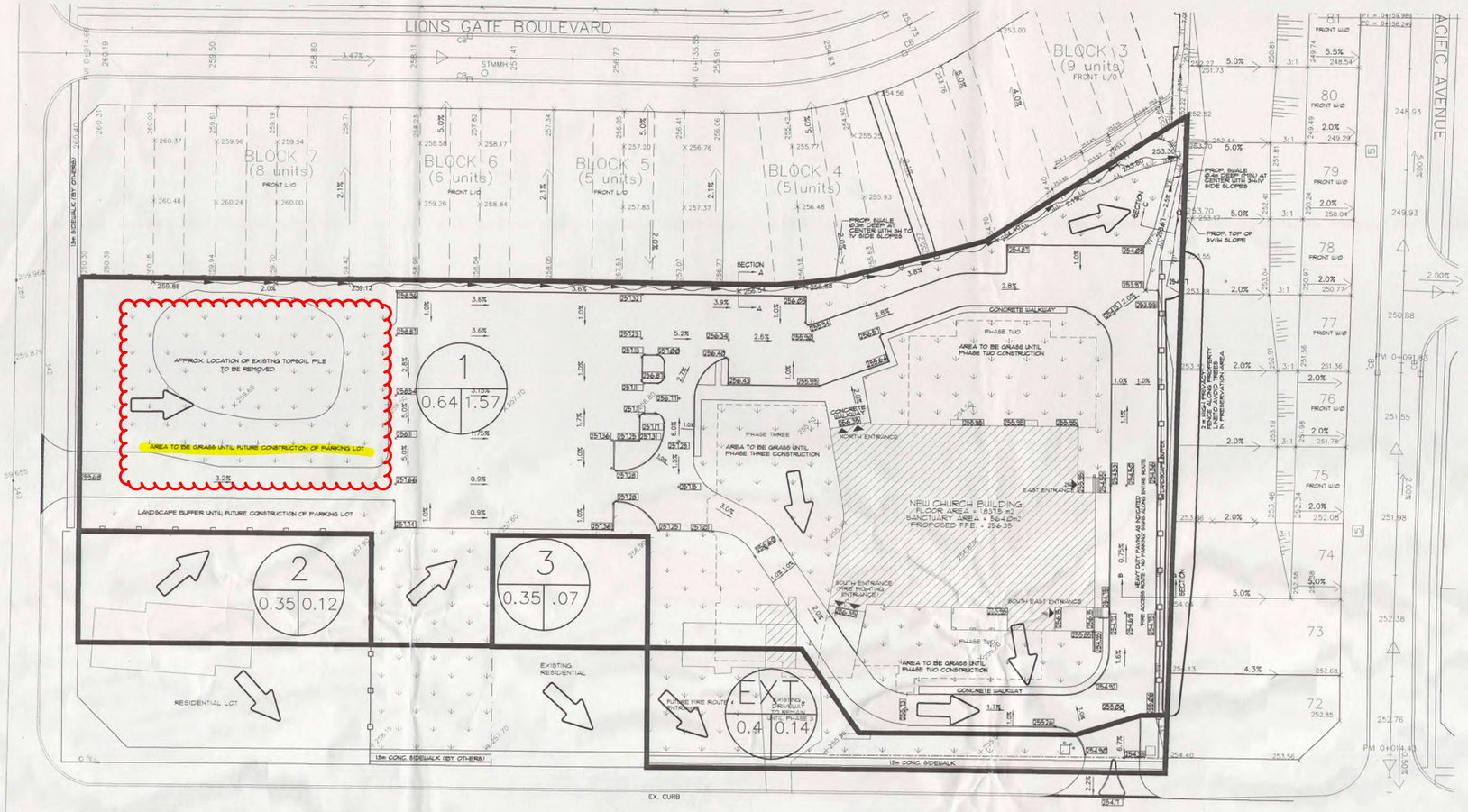
GEI Consultants
647 Welham Rd, Unit 14, Barrie, ON, L4N 0B7
P: (705) 719-7994

Client: Cal-Parc Developments Inc.	Scale: N.T.S.
	Date: July 2023
Project: Proposed Townhouse Development	Drawn By: G. W.
	Project No: 2300804
Title: TEST PIT LOCATION PLAN	FIGURE 1

APPENDIX C

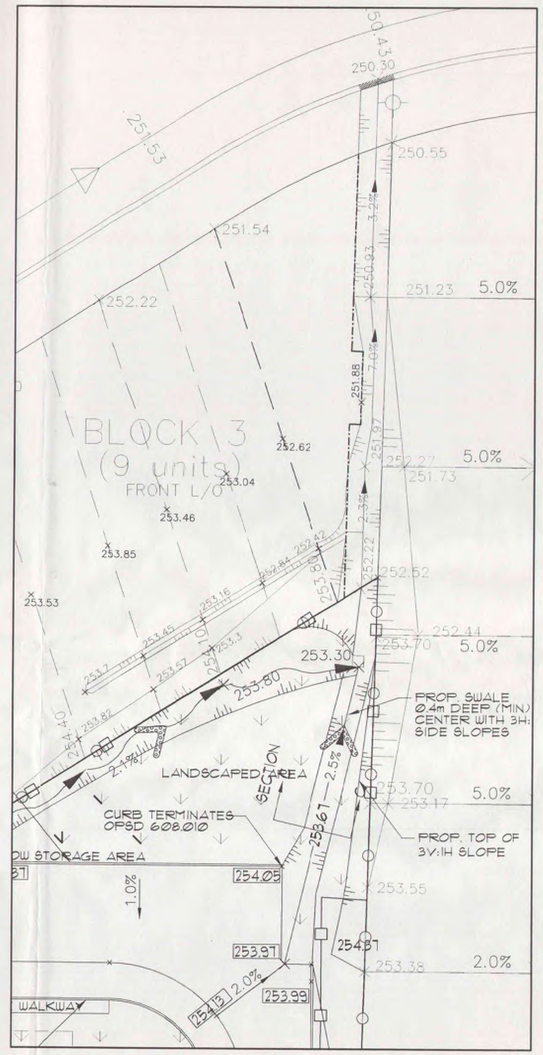
Design Calculations

PINESTONE ENGINEERING LTD.



CATCHMENT AREAS

AREA #
RUN-OFF COEFICIENT
AREA (ha)



100-YEAR OVERLAND FLOW ROUTE

SCALE 1:250

BENCH MARKS

ELEV. 264.692
TABLET SET HORIZONTALLY IN SOUTH FACE OF NORTH GUARDRAIL OF BRIDGE CARRYING HIGHWAY 400 OVER DUCKWORTH ST. 6.85m EAST OF WEST END OF CONCRETE GUTTER, 22.25m WEST OF DUCKWORTH ST. CENTERLINE, 24cm ABOVE HIGHWAY 400 LEVEL.
FIRST ORDER BENCH MARK 84U118

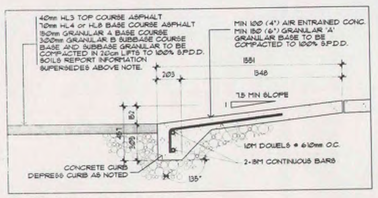
No.	REVISION	DATE	APPROVED
1	COB COMMENTS	31/03/03	H.G.G.
2	REVISED PARKING LOT CONFIG.	07/04/03	H.G.G.
3	COB COMMENTS	06/07/03	H.G.G.
4	REVISED ENTRANCE CONFIG.	27/05/03	H.G.G.
5	REVISED HYDRANT LOCATION	19/06/03	H.G.G.

RICHARDSON ENGINEERING LTD.
CONSULTING ENGINEERS
Unit D, 4 Cedar Pointe Drive
Barrie, Ontario L4N 5R7
Tel. (705) 728-0009
Fax (705) 727-7774
E-mail: engineer@richardson.on.ca

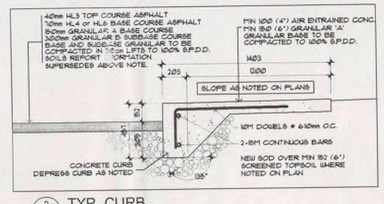
SITE PLAN
BARRIE FREE METHODIST CHURCH
STORM DRAINAGE

CITY of BARRIE
ENGINEERING DEPARTMENT

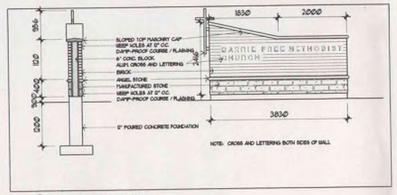
DESIGN C.M. / H.G.G.	SCALE 1:500
DRAWN C.M. / H.G.G.	REVIEWED B. RICHARDSON
DATE FEB. 27, 2003	DRAWING No. 0338-SP3
MMA No.	SHEET No. 03 OF 03



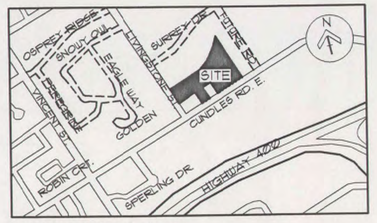
1 / A1 TYP. DEP. CURB
SCALE: 1:20



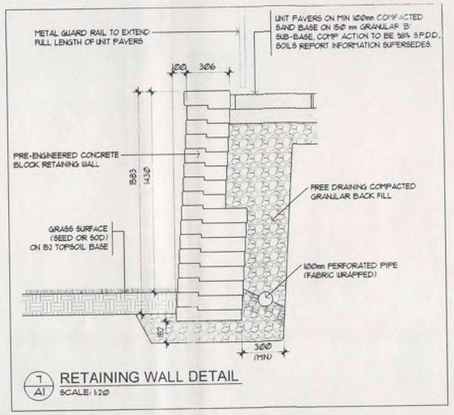
2 / A1 TYP. CURB
SCALE: 1:20



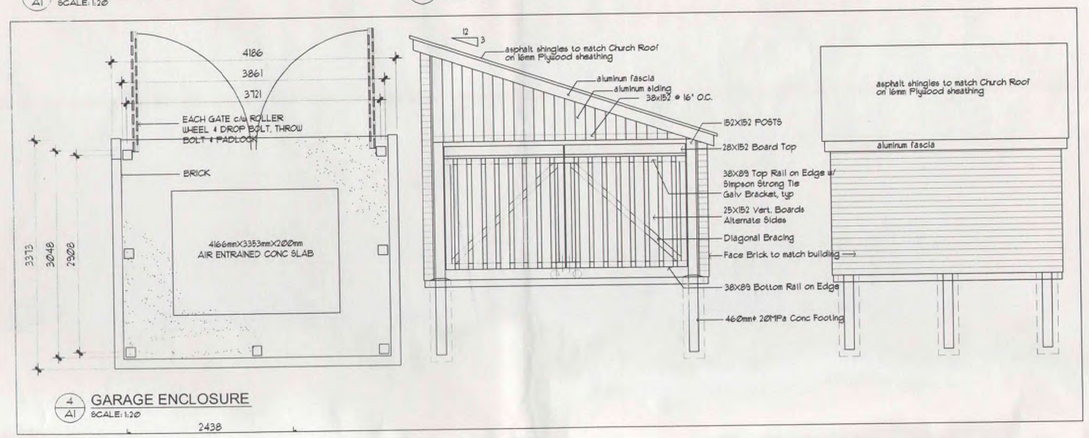
3 / A1 SIGN DETAIL
SCALE: 1:50



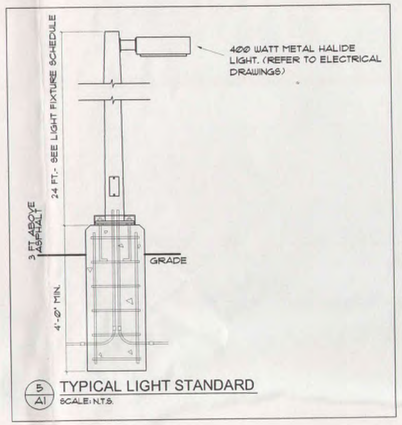
SITE LOCATION MAP



7 / A1 RETAINING WALL DETAIL
SCALE: 1:20



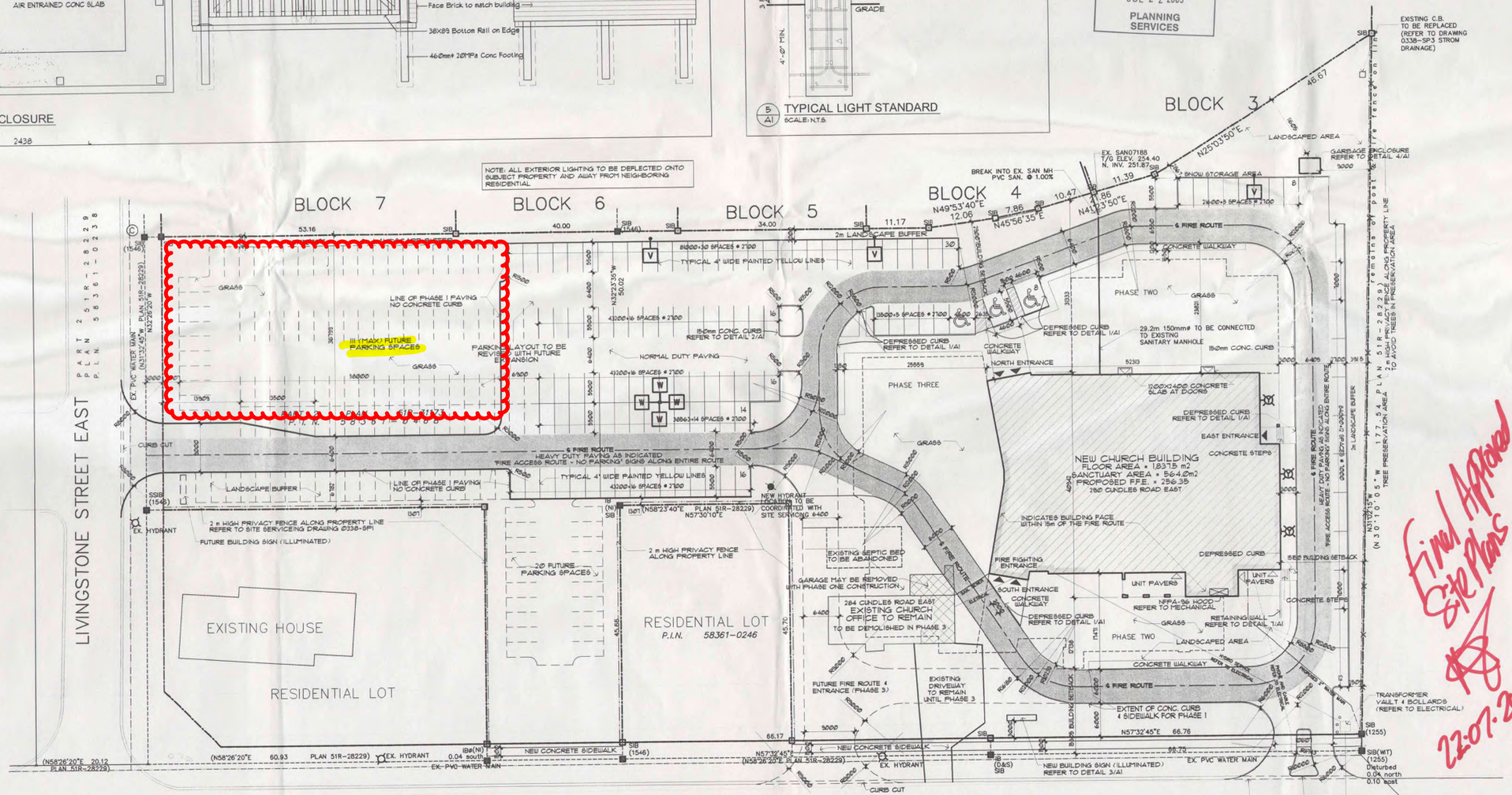
4 / A1 GARAGE ENCLOSURE
SCALE: 1:20



5 / A1 TYPICAL LIGHT STANDARD
SCALE: N.T.S.

CITY OF BARRIE
RECEIVED
JUL 2 2 2003
PLANNING SERVICES

NOTE: ALL EXTERIOR LIGHTING TO BE DEFLECTED ONTO SUBJECT PROPERTY AND AWAY FROM NEIGHBORING RESIDENTIAL



6 / A1 SITE PLAN
SCALE: 1:400

PROJECT NORTH
TRUE NORTH

BOUNDARY INFORMATION TAKEN FROM
PLAN OF SURVEY
OF PART OF
PART OF LOT 20,
CONCESSION 3
290 CUNDLES ROAD EAST
IN THE
CITY OF BARRIE
IN THE
COUNTY OF SIMCOE
PREPARED BY RUDY MAK SURVEYING LTD. RUDY MAK O.L.S.

19.6.1 # A-2 OCCUPANCY BUILDING IS DESIGNED TO 1995 OBC SECTION 3.2.2.2b, SINGLE STOREY, COMBUSTIBLE CONSTRUCTION FACING 2 STREETS, UNSPRINKLERED (MAXIMUM AREA 2150m²). FUTURE PHASES TWO TO NORTH & PHASE THREE TO THE WEST TO BE SEPERATED BY FIREWALLS, ALSO 3.2.2.2b

SCALE 1:400 METRIC
-3 0 3 9 18 27 METERS

METRIC

DISTANCES SHOWN ON THIS PLAN ARE IN METERS AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

BEARING NOTE

BEARINGS ARE 6° UTM GRID BEARING AND ARE REFERENCED TO THE CENTRAL MERIDIAN IN ZONE 17 (81°W) AND ARE DERIVED FROM OBSERVATIONS ON MNR CONTROL MONUMENTS NO. 010884-0472 (N:4918917.861E:620949.991) AND NO. 010886-0472 (N:4918900.470, E:620883.315) NAD 27, 1976 ADJUSTMENT.

SITE STATISTICS

SITE AREA	8,751.13 m2	3.89 Ac
	A-2 OCCUPANCY	
BUILDING AREA (ALL PHASES)		4,352.4 m2
BUILDING COVERAGE (ALL PHASES)		27.6 %
BUILDING AREA (PHASE I)		1,837.8 m2
BUILDING COVERAGE (PHASE I)		11.7 %
LANDSCAPED AREA (ALL PHASES)		2,924.4 m2
PERCENT LANDSCAPED AREA (ALL PHASES)		18 %
LANDSCAPED AREA (PHASE I)		7,360.32 m2
PERCENT LANDSCAPED AREA (PHASE I)		40.1 %
SANCTUARY (PHASE 3)		1200 PERSONS
SANCTUARY (PHASE I)		600 PERSONS
PARKING REQ'D (1/5 PERSONS IN WORSHIP)		
TOTAL PARKING PHASE 3	(240 SP REQ'D)	240 SPACES
TOTAL PARKING PHASE I	(120 SP REQ'D)	120 SPACES
PARKING SPACE SIZE		2.7m X 5.5m
BARRIER FREE PARKING		3 SPACES @ 4.6m X 5.5m
LOT COVERAGE PHASE I		51.6%
LOT COVERAGE PHASE 3		84%
BUILDING PERIMETER		169.44 m
BUILDING PERIMETER WITHIN 15m OF FIRE ROUTE		130.23 m
% OF PERIMETER WITHIN 15m OF FIRE ROUTE		76.8%

LEGEND

DENOTES NEW FENCE
DENOTES LOT LINES
DENOTES FOUND SURVEY MONUMENT
DENOTES PLANTED SURVEY MONUMENT
DENOTES STANDARD IRON BAR
DENOTES IRON BAR
DENOTES IRON BAR (Ø.16 X Ø.016 X Ø.61)
DENOTES WITNESS
DENOTES REMAINS OF POST & WIRE FENCE
DENOTES ROUND IRON BAR
DENOTES SHORT STANDARD IRON BAR

COORDINATE SITE PLAN WITH SITE SERVICING AND GRADING PLAN, BY RICHARDSON ENGINEERING LTD. Ø4 APRIL Ø3
COORDINATE SITE PLAN WITH LANDSCAPE PLAN, BY STEFAN BOLLIGER ASSOCIATES LTD. Ø4 APRIL Ø3

NO	DATE	REVISION
8	16 JUL 03	FENCE ADDED TO RESIDENTIAL LOT(58361-0246)
7	14 JUL 03	FIRE HYDRANT RELOCATED&LIGHT STD. DETAIL
6	10 JUL 03	BRICK GARBAGE ENCL., LIGHT STD. ADDED
5	02 JUN 03	REVISED NEW HYDRANT LOCATION
4	21 MAY 03	REVISED AS PER CITY COMMENTS (02 MAY 03)
3	07 APR 03	RE-SUBMITTED FOR SPA & BUILDING PERMIT
2	04 APR 03	REVISED AS PER CITY OF BARRIES COMMENTS
1	28 FEB 03	SUBMITTED FOR S.P.A. & BUILDING PERMIT

Final Approved Site Plans
22.07.2003

ONTARIO ASSOCIATION OF ARCHITECTS
J. DAVID McAULEY LICENCE 2950

J.DAVID McAULEY ARCHITECT INC.
(519) 823-2441
FAX (519) 821-8140
360 WOOLWICH ST.
GUELPH ON N1H 3W6
E-mail: office@jdm-arch.com

PROJECT
NEW CHURCH
BARRIE FREE METHODIST
284/290 CUNDLES ROAD EAST
BARRIE, ONTARIO

DRAWING NAME
SITE PLAN
PHASE 2 & 3 WORKS

PLOT DATE: 21 APR 03	PRINT DATE:
SCALE: AS SHOWN	PROJECT MANAGER: GW
FILE: A1-Site Plan.dwg	DRAWING NO.: 0108 A1

FLOW TEST RESULTS

FIRST FOR FIRE, LIFE SAFETY & SECURITY
VIPOND INC
est. 1945

DATE : JUNE 8, 2023

TIME VALVE OPENED: 2:15 PM
TIME LAST VALVE CLOSED: 2:45 PM

LOCATION : 290 CUNDLES ROAD EAST
BARRIE
ONTARIO

TEST BY : IMRAN AHMAD – T.H.

STATIC PRESSURE : 100 PSI

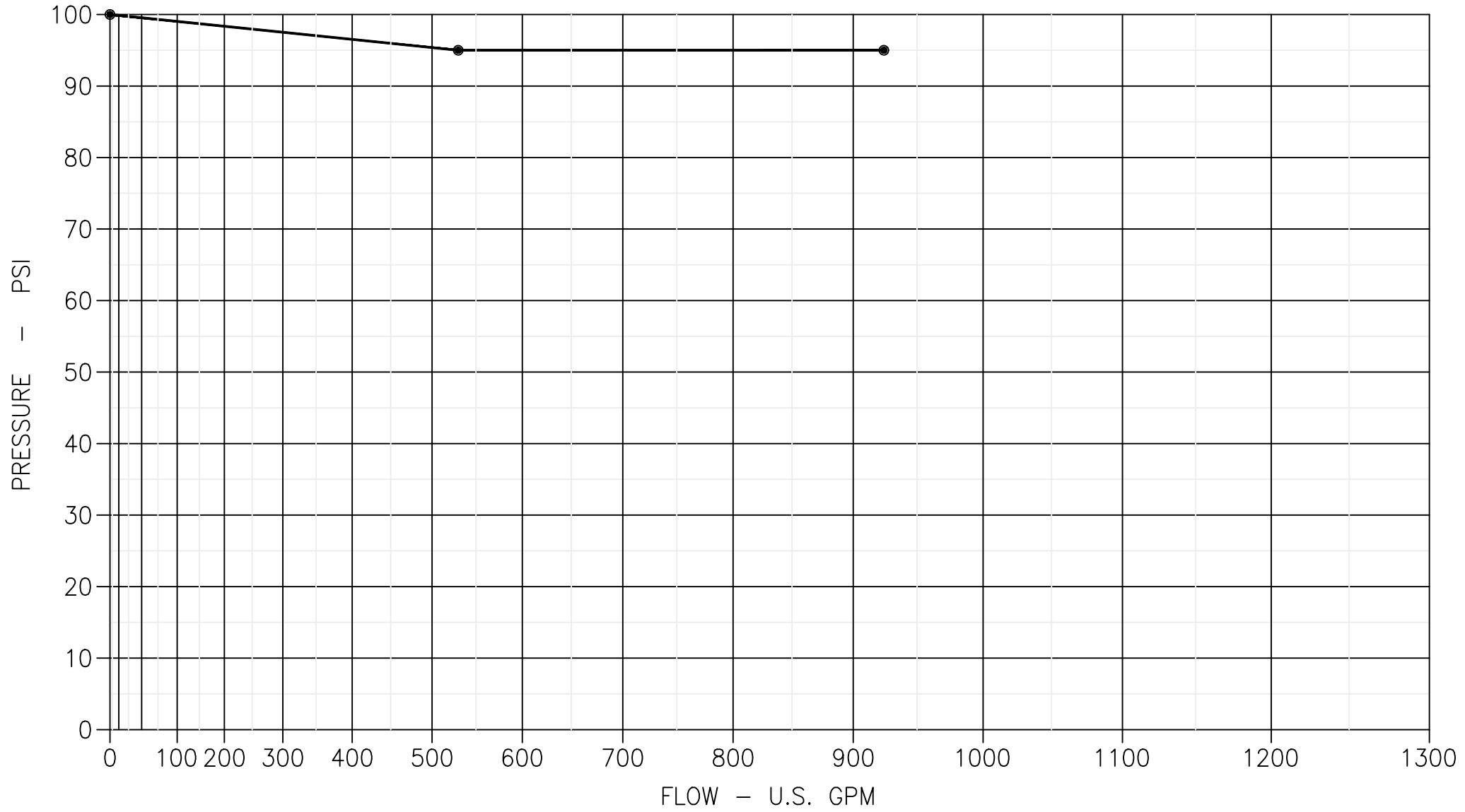
TEST NO.	NO. OF NOZZLES	NOZZLE DIAMETER (INCHES)	DISCHARGE CO–EFFICIENT	RESIDUAL PRESSURE (PSI)	PITOT PRESSURE (PSI)	DISCHARGE (U.S.GPM)
1	1	1–3/4	0.995	95	36	534
2	1	2–1/2	0.90	95	30	924

FIRST FOR FIRE, LIFE SAFETY & SECURITY

VIPOND INC est. 1945

290 CUNDLES ROAD EAST	BY : IMRAN AHMAD– T.H.
BARRIE	OFFICE : BARRIE
ONTARIO	TEST BY : VIPOND & PUC
	DATE : JUNE 8, 2023

STATIC:	RESIDUAL:		FLOW:
100 PSI	TEST#1 95 PSI	@	534 GPM
	TEST#2 95 PSI	@	924 GPM



290 Cundles Road East TH Development

City of Barrie

SANITARY SEWER DESIGN SHEET

ENGINEERING AND PUBLIC WORKS

Project Number: 23-11757B
Date: July 17th, 2023
Design By: DH
Checked By: JHV
File: \\PINESTONESERVER\Shared Folders\Company\Project Documents\11757B 290 Cundles Road East Townhomes\FSR\Sanitary Sewer Design Sheet.xls

Drainage Area Plan No: N/A

Design Parameters

Average Daily Flow
Residential 0.0026 L/s/c
Commercial 0.324 L/s/ha

Mannings "*n*" 0.0130
Min. Velocity 0.60 m/sec
Max. Velocity 3.0 m/sec
Residential Harmon Peaking Factor (F)
Infiltration 0.10 L/s/ha

PINESTONE ENGINEERING LTD.

LOCATION				RESIDENTIAL AREAS and POPULATION						SCHOOL, INSTITUTIONAL			COMMERCIAL			INDUSTRIAL				INFILTRATION			DESIGN						
										HECTARES AND FLOW OF EACH ZONING																		
										0.00 *L/s/ha*			0.324 *L/s/ha*			0.00 *L/s/ha*												
STREET	AREA NO.	MANHOLE LOCATION FROM MH	MANHOLE LOCATION TO MH	AREA	UNITS	POPUL.	CUMUL POPUL.	PEAK FACTOR "F"	PEAK RES. FLOW	AREA	CUMUL AREA	PEAK FLOW	AREA	CUMUL AREA	PEAK FLOW	AREA	CUMUL AREA	PEAK FLOW	TOTALS-C-I FLOW	AREA	CUMUL AREA	INFIL FLOW	TOTAL VOLUME FLOW	LENGTH	SLOPE	PIPE SIZE	CAPACITY	FULL FLOW VELOCITY	ACTUAL VELOCITY
				ha		*1000s*	*1000s*		*L/sec*	*ha*	*ha*	*L/sec*	*ha*	*ha*	*L/sec*	*ha*	*ha*	*L/sec*	*L/sec*	*ha*	*ha*	*L/sec*	*L/sec*	*m*	*%*	*mm*	*L/sec.*	*m/s*	*m/s*
Proposed TH Development (22 Units)	1			0.28	22.00	0.051	0.051	4.312126	0.5781										0.5781	0.28	0.28	0.0280	0.6061						
																								48.6	1.00	250	59.4373	1.211	

Capacity of Immediate Downstream Reach of 250mm dia. Sanitary Sewer =

Fire Flow Calculations – Fire Underwriters Survey 1999

290 Cundles Road East Townhouse Development

Total Floor Area of Building (excluding parking) = 1188m^2

Fire demands for the proposed development were calculated in accordance with the Fire Underwriters Survey (FUS) as follows:

$$F = 220C(A)^{0.5}$$

Where,

F = the required fire flow in litres per minute.

C = coefficient related to the type of construction.

A = total floor area of building (excluding basements) calculated as per FUS

C = 1.0 for ordinary construction

F = 220 * 1.0 * (1188) ^ 0.5
F = 7600 L/min
F = 126.7 L/sec

Reductions:

Reduction for low hazard occupancy (-25%)
Fire flow = 95.0 L/sec

Exposure charge for buildings to the west (+15%x2)

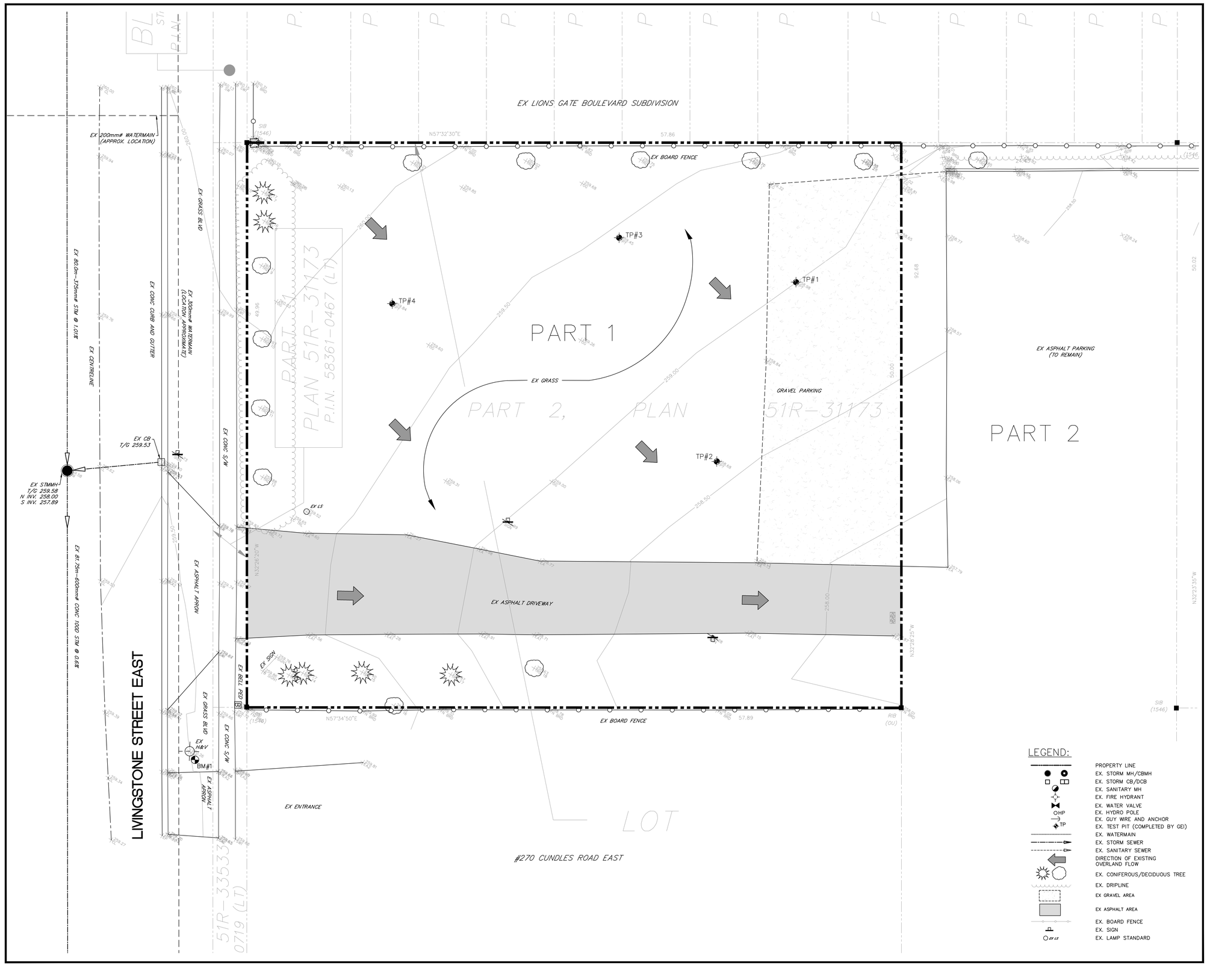
Total charge = 30% or 28.5 L/sec on the 95.0 L/sec fire flow

Required fire flow as per FUS 1999 calculation = 123.5 L/sec

APPENDIX D

Conceptual Engineering Drawings

PINESTONE ENGINEERING LTD.



LEGEND:

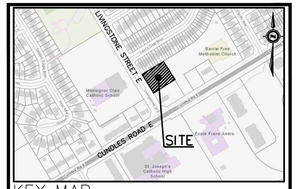
- PROPERTY LINE
- EX. STORM MH/CBMH
- EX. STORM CB/DCB
- EX. SANITARY MH
- EX. FIRE HYDRANT
- EX. WATER VALVE
- HP EX. HYDRO POLE
- EX. GUY WIRE AND ANCHOR
- TP EX. TEST PIT (COMPLETED BY GEI)
- EX. WATERMAIN
- EX. STORM SEWER
- EX. SANITARY SEWER
- DIRECTION OF EXISTING OVERLAND FLOW
- EX. CONIFEROUS/DECIDUOUS TREE
- EX. DRIPLINE
- EX GRAVEL AREA
- EX ASPHALT AREA
- EX. BOARD FENCE
- EX. SIGN
- EX LS EX. LAMP STANDARD

PEL
PINESTONE ENGINEERING LIMITED | www.pel.ca

The position of existing above ground and underground utilities and facilities are not necessarily shown on the drawings, and where shown, the accuracy of the position of such utilities and facilities is not guaranteed. Before starting work, the contractor shall confirm the exact location of all existing utilities and facilities, and shall assume all liability for damage to them

Drawings shall not be used for construction unless sealed and signed. All work to be performed in accordance with the Occupational Health & Safety Act 1990.

Any errors and/or omissions shall be reported to Pinestone Engineering Ltd. without delay.



KEY MAP

NOTES

1. LEGAL INFORMATION PROVIDED BY RUDY MAK SURVEYING LTD.
2. TOPOGRAPHIC SURVEY PROVIDED BY JOETOPO SURVEYS AND CADD INC., DATED APRIL 04, 2023.
3. SITE PLAN PREPARED BY INNOVATIVE PLANNING SOLUTIONS, DATED APRIL 05, 2023.

BENCHMARK

BM#1
TUP NUT OF HYDRANT ON LIVINGSTONE STREET AT SOUTH WEST CORNER OF THE SITE
ELEVATION 260.26

NO.	YY.MM.DD	REVISION	BY

SEAL

NORTH ARROW

DESIGN BY:	D.H.
DRAWN BY:	C.A.
CHECKED	J.V.
DATE:	JUNE 2023
SCALE:	1:150

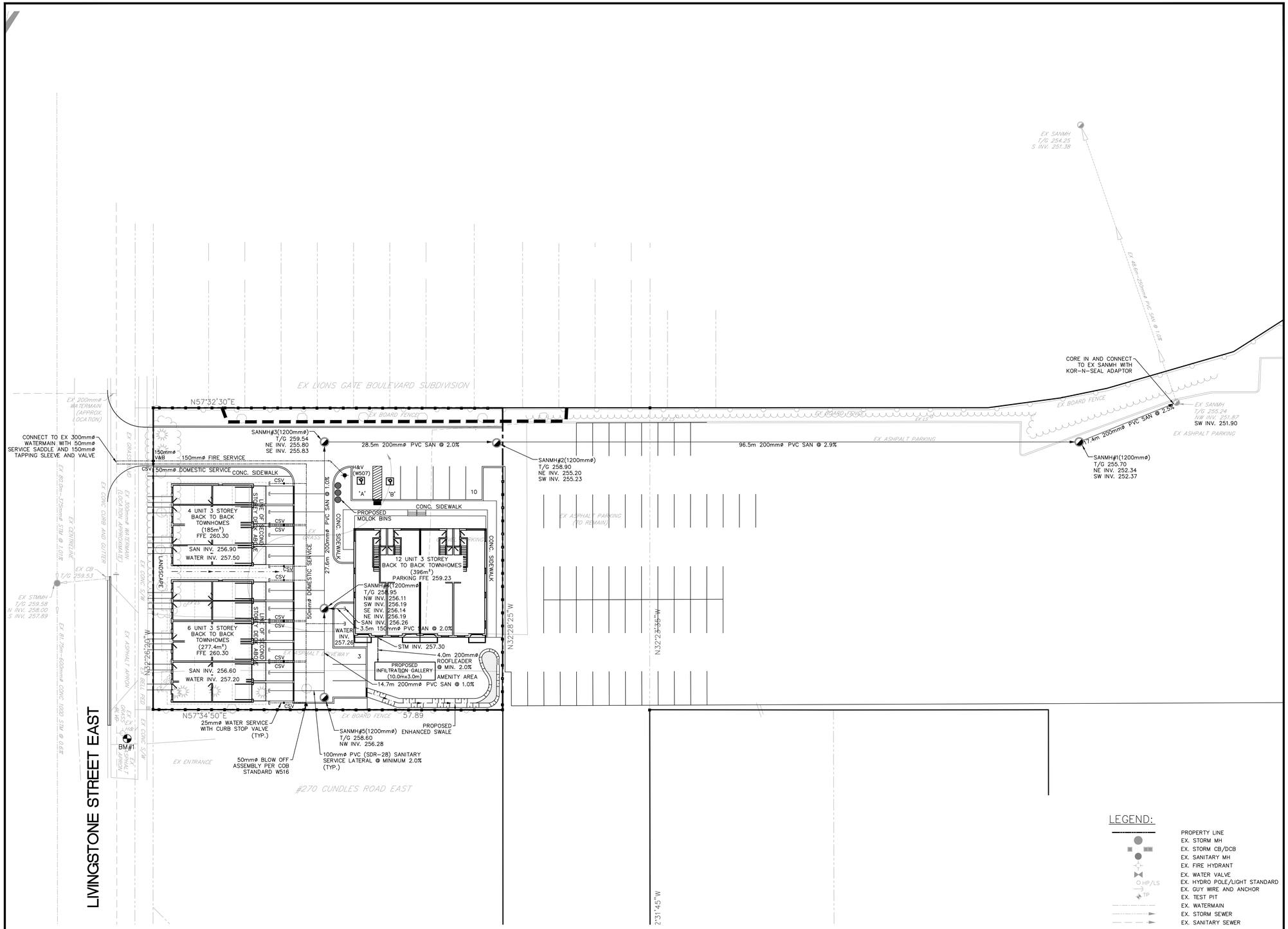
CLIENT/PROJECT

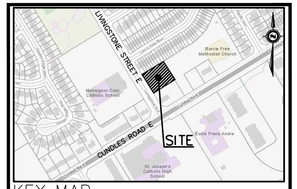
PROPOSED RESIDENTIAL DEVELOPMENT
290 CUNDLES ROAD EAST
CITY OF BARRIE
FILE D28-080-2022

DRAWING TITLE

EXISTING CONDITIONS PLAN

PROJECT NO.	DRAWING NO.	REVISION
23-11757-B	EX-1	0





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ELEVATION 260.26

NO.	YY.MM.DD	REVISION	BY

SEAL

NORTH ARROW

LEGEND:

- PROPERTY LINE
- EX. STORM MH
- EX. STORM CB/DCB
- EX. SANITARY MH
- EX. FIRE HYDRANT
- EX. WATER VALVE
- HP/LS EX. HYDRO POLE/LIGHT STANDARD
- EX. GUY WIRE AND ANCHOR
- TP EX. TEST PIT
- EX. WATERMAIN
- EX. STORM SEWER
- EX. SANITARY SEWER
- PROP. WATER VALVE
- PROP. CATCHBASIN
- PROP. STORM MH/CBMH
- PROP. SANITARY MH
- PROP. WATERMAIN
- PROP. STORM SEWER
- PROP. SANITARY SEWER
- PROP. WATER SERVICE C/W CSV
- PROP. SANITARY SERVICE
- PROP. TREE PRESERVATION FENCE

DESIGN BY:	D.H.
DRAWN BY:	C.A.
CHECKED	J.V.
DATE:	JUNE 2023
SCALE:	1:300

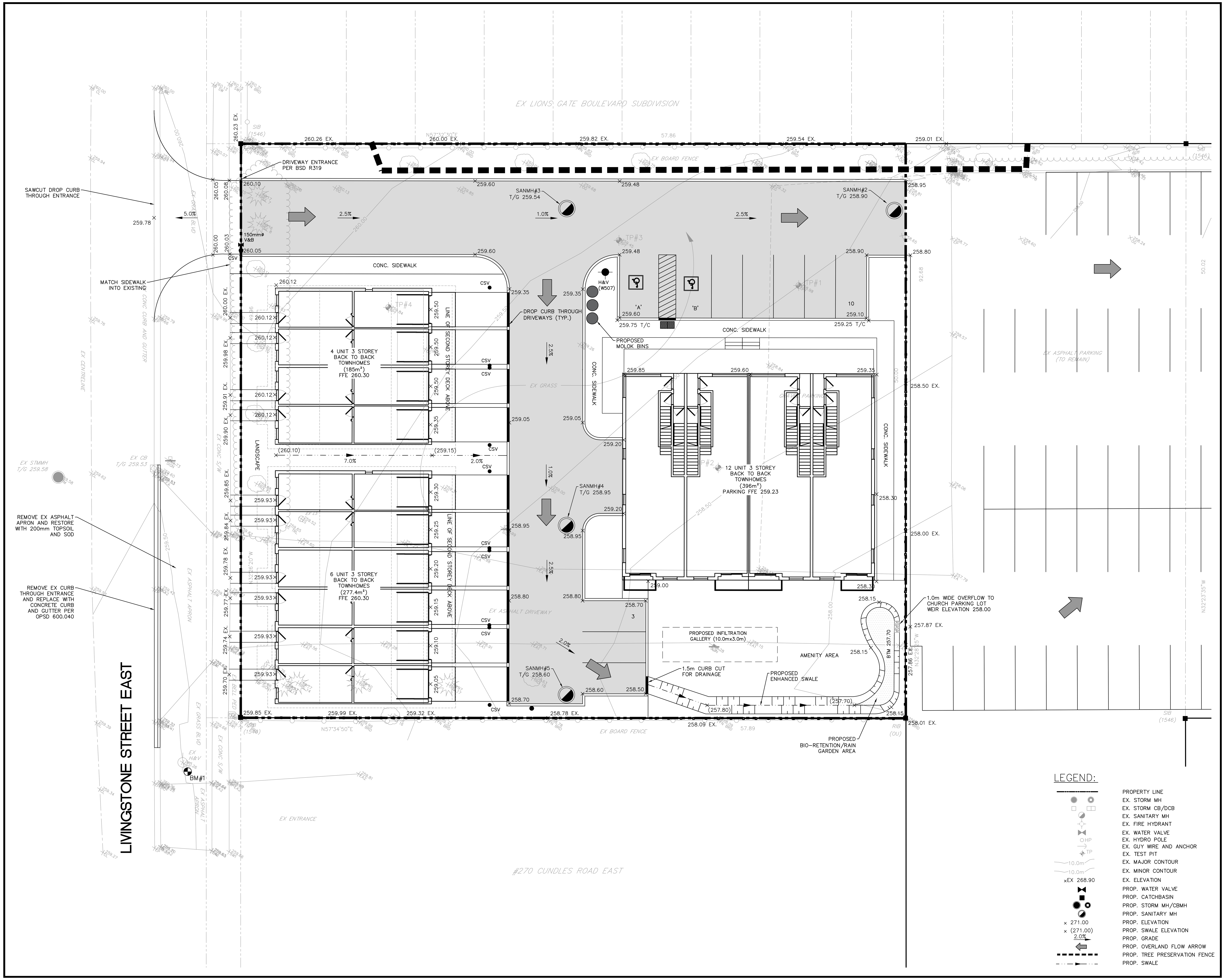
CLIENT/PROJECT

PROPOSED RESIDENTIAL DEVELOPMENT
290 CUNDLES ROAD EAST
CITY OF BARRIE

DRAWING TITLE

CONCEPTUAL SERVICING PLAN

PROJECT NO.	DRAWING NO.	REVISION
23-11757-B	SERV-1	0



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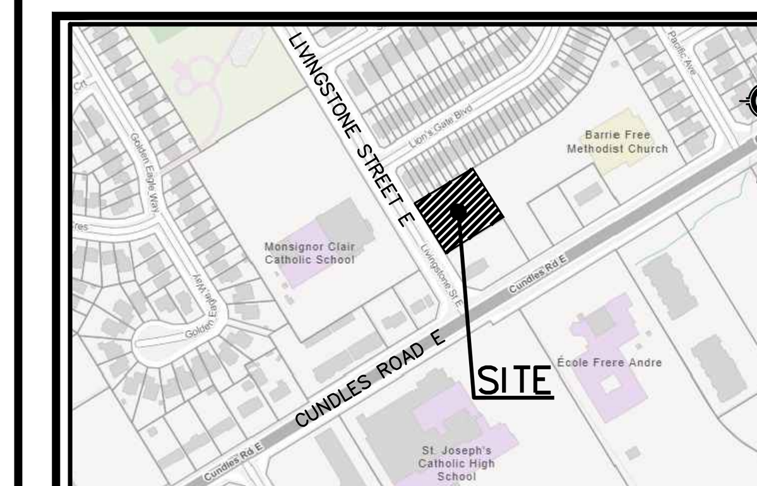

KEY MAP

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BENCHMARK

BM#1
TUP NUT OF HYDRANT ON LIVINGSTONE STREET AT SOUTH WEST CORNER OF THE SITE
ELEVATION 260.26

NO.	YY.MM.DD	REVISION	BY

SEAL

NORTH ARROW

DESIGN BY:	D.H.
DRAWN BY:	C.A.
CHECKED	J.V.
DATE:	JUNE 2023
SCALE:	1:150

CLIENT/PROJECT

PROPOSED RESIDENTIAL DEVELOPMENT
290 CUNDLES ROAD EAST
CITY OF BARRIE

DRAWING TITLE

CONCEPTUAL GRADING PLAN

PROJECT NO.	DRAWING NO.	REVISION
23-11757-B	GP-1	0